

Customer No. 24498  
Serial No. 10/528,636

PATENT  
PF020128 RECEIVED  
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**REMARKS**

Reconsideration of this application as amended is respectfully requested. Claims 1-6 are in this application and are presented for the Examiner's consideration in view of the following comments.

Claims 1-2 and 3-6 have been rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,821,945 issued October 13, 1998 to Yeo et al. (*Yeo*) in view of U.S. Patent No. 7,054,367 issued May 30, 2006 to Oguz et al. (*Oguz*) and further in view of U.S. Patent No. 7,212,201 issued May 1, 2007 to Geiger et al. (*Geiger*). Applicants continue to respectfully disagree.

The Examiner states that "*Oguz* describes temporal distance" as claimed by Applicants, i.e., that *Oguz* describes "[k]ey frames or features/attributes of a video sequence change - col. 5, line 39 to col. 6, line 35". Applicants respectfully submit that the Examiner is wrong and *Oguz* does not describe temporal distance as claimed by Applicants. For example, in this portion of *Oguz*, the values of the DC coefficients of the DCT blocks, which are differentially coded (except for the first one of the slice), are compared, for neighboring blocks, in order to detect an edge. The lengths that are compared to a threshold are the lengths of the VLC coded words coding the DC coefficients of the blocks of an image. In point of fact, in this portion of *Oguz* processing is **only being performed on an image** and there is no mention of a temporal distance relating to images as required by Applicants' claim 1.

Applicants also note that the Examiner states that *Oguz* describes temporal distance by computing "a degree of coincidence between significant edges in a current frame and significant edges in a prior frame to within a distance and temporal distance" on col. 8, 2<sup>nd</sup> paragraph of *Oguz*. Again, with respect to the requirements of Applicants' claim 1, the Examiner is wrong. This distance is only a spatial distance.

Applicants do note that the distance disclosed on line 14 of *Oguz* is a temporal distance between the current and prior frames. But, this temporal distance is used to determine the amount of motion in the scene (*Oguz*, line 15). The motion amplitude is calculated between a first frame corresponding to a first instant and a second frame corresponding to a second instant and this depends, for a given speed of the object

Customer No. 24498  
Serial No. 10/528,636

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moving within the scene, on the temporal distance between the two instants. This temporal distance allows one to determine the number of blocks to consider (vicinity) in order to calculate the similarities (the degree of coincidence between significant edges in a prior frame mentioned in line 9). Consequently, the disclosed temporal distance in *Oguz* - which is the one from the current frame to previous frames - is used to scale motion in order to define vicinity and to compute a coincidence coefficient in order to detect a scene cut, as explained in lines 13-15 of *Oguz*.

In contrast, Applicants' claimed invention is different. In Applicants' claimed invention temporal distance is not used to define criteria (such as vicinity) to perform correlation calculations as in *Oguz* or to calculate attribute differences. The way the attribute differences are calculated is not specified in claim 1. What Applicants do claim and disclose is the calculation of a potential of an edge according to the temporal distance between the key images relating to the nodes connecting this edge. What Applicants also claim is the decision of merging two nodes depending on the temporal distance of the key images relating to these nodes. In Applicants' claimed invention, the potential of the edge linking two key frames is a function of the temporal distance.

In contrast to Applicants' claimed invention, in *Oguz* the temporal distance is only used to scale motion to define vicinity for the calculation of the coincidence coefficients. One skilled in the art knows that the size of correlation search windows depend on the temporal distance between frames as the motion amplitude increases with the temporal distance. But - the value of the coincidence coefficient is not a function of the temporal distance. For example, a current frame identical to frame F1 and frame F2 and respectively temporally distant of D1 and D2 gives a same coincidence coefficient in *Oguz* whatever D1 and D2. However in Applicants' claimed invention, the potential of the edge linking the current frame to F1 will be different from the potential of the edge linking the current frame to F2 if D1 is different from D2.

As explained in Applicants' specification (p 13, lines 34-39), the method allows to merge similar images even if they are distant (temporally speaking) or less similar images if they are close. The advantage is that it is possible to take into account, for

Customer No. 24498  
Serial No. 10/528,636

PATENT  
PF020128

the merging, scenes which are very far from each other, due to the iterations making key images becoming closer within the graph (page 4, lines 7-11), without increasing calculations (no need to limit the number of frames or shots to limit calculations as in prior art, top of page 2 of the specification). As explained on page 4, lines 21-24 of Applicants' specification, the advantage is the taking into account of images even if they are temporally far apart while favoring the clustering of temporally close images. In a different way, it could be said that there are two steps in the process. The first step is the calculation of the difference in attributes, or the coincidence coefficient between two frames. The second step is the calculation of the potential of an edge. *Oguz* relates to the first step, Applicants' claim the second step.

In summary, none of the cited prior art describes or suggests Applicants' claimed invention.

*Yeo* describes a method for video browsing based on content and structure. A hierarchical scene transition graph is used. The nodes of the graph capture the core contents of the video while the edges capture its structure. At each level of the hierarchy, a different criterion for clustering is imposed. The clustering algorithms are built on dissimilarity measures defined for color, shape. In *Yeo* there is no description or suggestion about temporal distances and merging of nodes according to potentials which are function of these temporal distances as claimed by Applicants. There is no description or suggestion in *Yeo* about using the potential of the edges for deciding the merging of nodes as claimed by Applicants.

*Oguz* describes a process to detect a scene change by considering significant edges in a current frame and significant edges in a previous frame. The temporal distance between the current frame and the prior frames and the amount of motion are taken into account to define the region where the coincidence coefficient is computed. *Oguz* describes the use of a temporal distance to determine parameters (number of blocks, see line 13-15 of col. 6) in order to calculate similarities between frames for the detection of the cut. *Oguz* does not describe or suggest about a use of the temporal distance between two frames to calculate the potential of the edge linking these two frames as claimed by Applicants.

Customer No. 24498  
Serial No. 10/528,636

PATENT  
PF020128

In contrast to the cited art, Applicants claim 1 specifies that the potential of an edge depends on the distance between the attributes of the nodes at the end of the edge and on the temporal distance between these nodes. The similarity parameter (distance between attributes) is combined to the temporal distance parameter for the decision of merging, giving a more reliable clustering as distant frames are taken into account while weighting is applied. This is not described or suggested in any combination of the cited prior art.

As explained in Applicants' specification, prior art discloses that, if two shots are separated by more than T images, the clustering is not possible (see page 2, lines 17-20). T has a fixed value. T is not matched to the sequence leading, for example, to overchopping. As such, the use of a temporal distance to calculate a similarity between frames, such as the one described in *Oguz* (temporal distance relating to close frames for scaling motion), is very common as the motion amplitude depends on this distance. Nevertheless, *Yeo*, which describes a graph structure, doesn't suggest such a use of the temporal distance for the calculation of the graph structure.

In view of the above, there is no description or suggestion *Yeo*, *Oguz* or *Geiger*, either singly or in any combination, about a combination of parameters such as a temporal distance and a distance between attributes to decide the merging of nodes as required by Applicants' claim 1.

In addition, Applicants' claim 3 specifies that the value of potential associated with the edges and with the merged node is a respectively decreasing and increasing function of temporal distance. Consequently, frames which are temporally distant are processed but, as the potential of the corresponding edge decreases with the distance and as the potential of the merged node to be obtained increases with the distance, they have less chance to be merged if they are distant (e.g., see bottom of page 6 and top of page 7 of Applicants' specification).

With regard to Applicants' claim 3, the Examiner cites *Oguz*, col. 7, lines 18-39. However, this portion of *Oguz* deals with edges within an image – this is different from edges of a graph structure. The VLC words coding the DC coefficients are used to estimate the similarity between frames. There is no description in this portion of

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JUN 18 2008

*Oguz* of temporal distances to calculate potentials of edges and nodes as this temporal distance is only mentioned for assessing the similarity of frames, i.e., for calculating the distance between attributes.

Indeed, none of the cited prior art, either singly or in combination, describes or suggests the use of such increasing and decreasing functions as required by Applicants' claim 3.

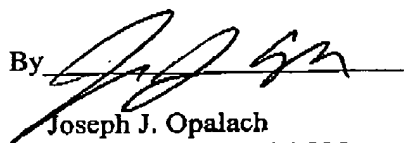
In view of the above, the combination of *Yeo*, *Oguz* and *Geiger* does not yield Applicants' claimed invention. As such, Applicants respectfully submit that independent claims 1, and dependent claims 2-6 are patentable over *Yeo* in view of *Oguz* and further in view of *Geiger*.

As it is believed that all of the objections set forth in the Official Action have been fully met, favorable reconsideration and allowance are earnestly solicited. If, however, for any reason the Examiner does not believe that such action can be taken at this time, it is respectfully requested that the Examiner telephone Applicants' attorney in order to overcome any additional objections that the Examiner might have.

If there are any additional charges in connection with this requested amendment, the Examiner is authorized to charge Deposit Account No. 07-0832 therefor.

Respectfully submitted  
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By



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